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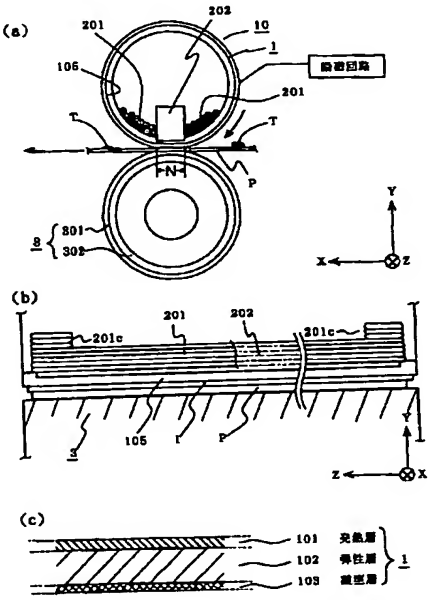
(54)【発明の名称】　加熱装置及び画像形成装置

(57)【要約】
【課題】　加熱装置において加熱部の被加熱材幅方向で均一な温度分布を保つこと。また、該加熱装置を備えた画像形成装置においても定着不良や光沢むらやオフセットの無い高いパフォーマンスを達成すること。
【解決手段】　固定もしくは移動する加熱部材と、交番磁界を発生させ該磁界の作用により該加熱部材を発熱させる磁界発生手段と、該加熱部材に圧接させてニップを形成する加圧部材と、を有し、該ニップに被加熱材を搬送し通過させて該加熱材を加熱する加熱装置であり、被加熱材搬送方向と直交する方向を被加熱材幅方向としたとき、前記磁界発生手段により発生させる磁束の密度を加熱部材の被加熱材幅方向において変えて、ニップの被加熱材幅方向の温度分布を均一にしたこと。



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【特許請求の範囲】

【請求項１】 固定もしくは移動する加熱部材と、交番磁界を発生させ該磁界の作用により該加熱部材を発熱させる磁界発生手段と、該加熱部材に圧接させてニップを形成する加圧部材と、を有し、該ニップに被加熱材を搬送し通過させて該加熱材を加熱する加熱装置であり、被加熱材搬送方向と直交する方向を被加熱材幅方向としたとき、前記磁界発生手段により発生させる磁束の密度を加熱部材の被加熱材幅方向において変えて、ニップの被加熱材幅方向の温度分布を均一にしたことを特徴とする加熱装置。

【請求項２】 固定もしくは移動する加熱部材と、交番磁界を発生させ該磁界の作用により該加熱部材を発熱させる磁界発生手段と、該加熱部材に圧接させてニップを形成する加圧部材と、を有し、該ニップに被加熱材を搬送し通過させて該加熱材を加熱する加熱装置であり、被加熱材搬送方向と直交する方向を被加熱材幅方向としたとき、前記磁界発生手段は被加熱材幅方向の加熱部材中央部よりも加熱部材端部における磁束密度を高くしたことを特徴とする加熱装置。

【請求項３】 前記磁界発生手段は磁界を発生させる励磁コイルの被加熱材幅方向において中央部よりも端部の巻数を多くしたことを特徴とする請求項１又は２の加熱装置。

【請求項４】 前記磁界発生手段は磁界を発生させる励磁コイルの被加熱材幅方向において端部近傍に補正用コアを配設し磁束を集中させたことを特徴とする請求項１乃至請求項３の何れかに記載の加熱装置。

【請求項５】 記録材上に担持させた顕画剤画像を加熱処理することを特徴とする請求項１乃至請求項４の何れかに記載の加熱装置。

【請求項６】 記録材上に顕画剤画像を担持させる像形成手段と、該顕画剤画像を加熱処理する像加熱装置としての請求項１乃至請求項４の何れかに記載の加熱装置と、を備えたことを特徴とする画像形成装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、電磁誘導を利用し加熱部に渦電流損を発生させる等して加熱する加熱装置及びそれを備えた画像形成装置に関する。該加熱装置は、特に電子写真複写機・プリンタ・ファックス等の画像形成装置における定着装置、即ち電子写真・静電記録・磁気記録等の適宜の画像形成プロセス手段により、加熱溶融性の樹脂等よりなるトナーを用いて記録材の面に直接もしくは間接方式で形成した未定着のトナー画像を記録材面に永久固着画像として加熱定着処理する装置に好適なものである。

【０００２】

【従来の技術】加熱定着装置に代表される加熱装置としては、従来から熱ローラ方式や、フィルム加熱方式等の

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所謂接触加熱方式が広く用いられている。

【０００３】その中でも、最大４層のトナー層を十分加熱溶融させる能力を要求されるフルカラーの画像形成を行う画像形成装置の定着装置では、高い熱容量を有する定着ローラの芯金や、トナー像を包み込んで均一に溶融するためのゴム弾性層等を介してトナー像の加熱を行なっている。

【０００４】このような装置においては、芯金やゴム弾性層等の介在部材を設けている為、良好な定着性を確保すると、熱源と被加熱材とが離れる傾向にあり、高効率化が困難であった。

【０００５】一方、特公平５－９０２７号公報では、磁束により定着ローラに渦電流を発生させジュール熱によって発熱させる電磁加熱方式の加熱装置が開示されており、渦電流の発生を利用することで発熱位置をトナー像に近くすることができ、ハロゲンランプを用いた熱ローラよりも高効率の定着プロセスを達成している。

【０００６】

【発明が解決しようとする課題】しかしながら上記電磁加熱方式の加熱装置では、加熱部端部の放熱や、磁束の発生状態が端部と中央部とで異なること等により、被加熱材への加熱が不均一になることがあった。この為、該加熱装置を備えた画像形成装置で定着不良や光沢ムラやオフセット等の問題が発生していた。

【０００７】そこで本発明の目的は、加熱装置において加熱部の被加熱材幅方向で均一な温度分布を保つこと。また、該加熱装置を備えた画像形成装置においても定着不良や光沢むらやオフセットの無い高いパフォーマンスを達成することにある。

【０００８】

【課題を解決するための手段】本発明は下記の構成を特徴とする加熱装置及び画像形成装置である。

【０００９】（１） 固定もしくは移動する加熱部材と、交番磁界を発生させ該磁界の作用により該加熱部材を発熱させる磁界発生手段と、該加熱部材に圧接させてニップを形成する加圧部材と、を有し、該ニップに被加熱材を搬送し通過させて該加熱材を加熱する加熱装置であり、被加熱材搬送方向と直交する方向を被加熱材幅方向としたとき、前記磁界発生手段により発生させる磁束の密度を加熱部材の被加熱材幅方向において変えて、ニップの被加熱材幅方向の温度分布を均一にしたことを特徴とする加熱装置。

【００１０】（２） 固定もしくは移動する加熱部材と、交番磁界を発生させ該磁界の作用により該加熱部材を発熱させる磁界発生手段と、該加熱部材に圧接させてニップを形成する加圧部材と、を有し、該ニップに被加熱材を搬送し通過させて該加熱材を加熱する加熱装置であり、被加熱材搬送方向と直交する方向を被加熱材幅方向としたとき、前記磁界発生手段は被加熱材幅方向の加熱部材中央部よりも加熱部材端部における磁束密度を高

くしたことを特徴とする加熱装置。

【００１１】（３）　前記磁界発生手段は磁界を発生させる励磁コイルの被加熱材幅方向において中央部よりも端部の巻数を多くしたことを特徴とする（１）又は（２）の加熱装置。

【００１２】（４）　前記磁界発生手段は磁界を発生させる励磁コイルの被加熱材幅方向において端部近傍に補正用コアを配設し磁束を集中させたことを特徴とする（１）乃至（３）の何れかに記載の加熱装置。

【００１３】（５）　記録材上に担持させた顕画剤画像を加熱処理することを特徴とする（１）乃至（４）の何れかに記載の加熱装置。

【００１４】（６）　記録材上に顕画剤画像を担持させる像形成手段と、該顕画剤画像を加熱処理する像加熱装置としての（１）乃至（４）の何れかに記載の加熱装置と、を備えたことを特徴とする画像形成装置。

【００１５】すなわち、上記コイルの両端部において、巻数を増し、中央部と比べて磁束を多めに発生させることや、上記コイルの両端部近傍に補正用コアを配設し、該端部で磁束を加熱部以外に四散させることなく加熱部に導くこと、等により、磁界発生手段で発生させる磁束の分布を適切に設定して、加熱部材の幅方向の温度分布を均一にすることができる。

【００１６】

【発明の実施の形態】

〈実施形態例１〉

（１）加熱装置の全体構成

図１（ａ）は本発明の定着装置の概略構成を示す横断面模型図、図１（ｂ）はその縦断面模型図、図１（ｃ）は定着フィルムの摸式断面図である。同図において１は定着フィルム、１０５は磁束の通過を妨げない絶縁性のフィルムガイドで、定着フィルム１はフィルムガイド１０５によって搬送安定性を図られながら矢印の方向に回転する。２０１は交番磁束を発生するための励磁コイル、２０２は励磁コイル２０１により発生した交番磁束を効率よくニップ周辺で高めるためのフェライトコアであり、フィルムガイド１０５によって支持されている。

【００１７】励磁コイル２０１には励磁回路が接続されており、この励磁回路は５０ＫＨｚの交番電流を励磁コイル２０１へ供給できるようになっている。３は加圧ローラで芯金３０１上にシリコーンゴム層３０２を２ｍｍ被覆させて弾性をもたせ、定着フィルム１を介してフィルムガイド１０５の下面に圧接してニップＮを形成している。また、加圧ローラ３は定着フィルム１を被加熱材としての記録材Ｐの搬送方向（図中Ｘ軸方向）に回転駆動させる駆動ローラの役割も兼ねている。

【００１８】而して、上記加熱装置は励磁回路から交番電流をコイル２０１に供給し、交番磁束を発生させ、該交番磁束がフェライトコア２０２に導かれて定着フィルム１の発熱層１０１に渦電流を発生させる。この渦電流が発熱層１０１の固有抵抗によってジュール熱を発生させて、弾性層１０２、離型層１０３を介してニップＮに搬送される記録材Ｐと記録材Ｐ上のトナーＴを加熱処理する。

【００１９】（２）定着フィルム１

定着フィルム１について説明すると、定着フィルム１は発熱体としてのニッケルからなる厚み５０μｍの発熱層１０１の表面をシリコーンゴムからなる弾性層１０２で被覆し、更にフッ素樹脂の離型層１０３で被覆してある。

【００２０】発熱層１０１としてはニッケル以外にも10^{-5}～10^{-10} Ω・ｍの電気良導体である金属、金属化合物、有機導電体を用いてもよく、より好ましくは透磁率が高い（強磁性を示す）鉄、コバルト等の純金属もしくはそれらの化合物を用いることができる。

【００２１】該発熱層１０１の厚みを薄くし過ぎると十分な磁路が確保できなくなり、外部へ磁束が洩れて発熱体自身の発熱エネルギーが小さくなる場合がある。また厚くすると熱容量が大きくなり昇温に要する時間が長くなる傾向がある。従って発熱層１０１の厚みは発熱体に用いた材料の比熱、密度、透磁率、抵抗率の値によって適正値があり、本実施形態では１０～１００μｍの厚みの範囲で、３℃／ｓｅｃ以上の昇温速度を得ることができた。

【００２２】弾性層１０２において、硬度が高すぎると記録材あるいはトナー層の凹凸に追従しきれず画像光沢ムラが発生してしまう。そこで、該弾性層１０２の硬度としては６０°（ＪＩＳ－Ａ）以下、より好ましくは４５°（ＪＩＳ－Ａ）以下がよい。また、弾性層１０２の熱伝導率λに関しては6×10^{-4}～2×10^{-3}［ｃａｌ／ｃｍ・ｓｅｃ・ｄｅｇ．］がよい。熱伝導率λが6×10^{-4}［ｃａｌ／ｃｍ・ｓｅｃ・ｄｅｇ．］よりも小さい場合には、熱抵抗が大きく、定着フィルム１の表層における温度上昇が遅くなる。

【００２３】離型層１０３としてはＰＦＡ、ＰＴＦＥ、ＦＥＰ等のフッ素樹脂以外に、シリコーン樹脂、シリコーンゴム、フッ素ゴム、等の離型性かつ耐熱性のよい材料を選択することができる。離型層１０３の厚さは２０～１００μｍが好ましく、該離型層１０３の厚さが２０μｍよりも小さいと、製造時に塗膜の塗ムラが生じて離型性の悪い部分ができたり、耐久性が不足するといった問題が発生する。また、離型層が１００μｍを越えると熱伝導が悪化するといった問題が発生し、特に樹脂系の離型層の場合は硬度が高くなりすぎ、弾性層１０２の効果が薄れてしまう。

【００２４】（３）励磁コイル２０１（図２）

励磁コイル２０１としては加熱に十分な交番磁束を発生するものでなければならないが、そのためには抵抗成分を低く、インダクタンス成分を高くとる必要がある。本実施形態では励磁コイル２０１の芯線として細線を束ね

た高周波用のφ１のものを用いて、図２に示すようにコア２０２を周回するように１２回巻いてある。

【００２５】従来図２（ａ）に示すような単一巻コイル２０２′であったのに対し、本実施形態例では図３（ａ）に示す様に１本の電線を連続して巻き、中央部の巻数（１２回）よりも両端部の巻数を増している。即ち磁界拘束力の弱い端部の損失を補正するように端部の巻き数を増し、部分的に磁束密度を強くしている。

【００２６】このような従来の励磁コイル２０１′と本例の励磁コイル２０１とを、他の構成を同じとした加熱装置に備え、長手方向の磁束密度とニップＮ温度の長手方向（被加熱材幅方向）の分布を比較し、図２（ｂ），図３（ｂ）に示した。

【００２７】従来の励磁コイル２０１′では図２（ｂ）に示すように磁束密度が長手方向にわたり略一定であり、加熱部材の幅方向端部での磁束光束力が弱いことや、放熱量が多いこと等により、ニップＮの温度は両端部で低くなっている。

【００２８】これに対し、本例の励磁コイル２０１では、図３（ｂ）に示すように長手方向端部の磁束密度を中央部と比べて高くしたことにより、ニップＮの長手方向全域に渡り均一な温度分布を得ている。このとき図４に示す領域Ｅにおいて、わずかな逆の磁界が生じるが、ニップＮの温度にはほとんど影響なく、無視できる程度である。

【００２９】更に図５の様に磁路を確保する為、フェライトコアを補正コイル２０１ｃの部分まで延長することでより効果的にすることができる。

【００３０】〈実施形態例２〉（図６・図７）

また他の実施形態例として図６の様に励磁コイル２０１の端部にコア２０２と同材質のフェライトコア２０３を配置し、端部から発散する磁束に対し磁路を確保することで磁界の発散を防止し端部の磁束密度を中央部分と同等以上にする事が可能となる。

【００３１】また、図７に示す様に補正コイル２０１ｃと共に補正用コア２０３を設けることにより、更に効果的に磁束の分布を設定できる。

【００３２】〈実施形態例３〉（図８）

図８の（ａ）・（ｂ）・（ｃ）はそれぞれ励磁コイル２０１の他の形態例を示したものである。

【００３３】（ａ）のものは、加熱部材を加熱させる為の主要部２０１ａと該主要部２０１ａに対して逆向きの補正部２０１ｂとを有し、主要部２０１ａによる磁束のうち中央部の磁束を補正部２０１ｂで減衰させ、相対的に端部の磁束密度を高めている。

【００３４】（ｂ）のものは、主要部２０１ａに対し、補正部２０１ｂを被加熱材幅方向端部では順方向、中央部では逆方向とし、磁束の分布をより効果的に補正している。

【００３５】（ｃ）のものは、被加熱材幅方向にｎ個のコイル２０１_1～２０１_nを直列若しくは並列（図示は直列）に接続し並設しており、中央部のコイル２０１_2～２０１_{n-1}に比べて端部のコイル２０１_1，２０１_nの巻数を増している。

【００３６】〈実施形態例４〉（図９）

図９の（ａ）・（ｂ）・（ｃ）はそれぞれ電磁誘導加熱方式の加熱装置の他の構成形態例を示したものである。

【００３７】（ａ）のものはステー（フィルムガイド）１０５，励磁コイル２０１，コア２０２等を有する電磁誘導加熱構造体Ｒの下面（ステー１０５の下面）と、駆動ローラー４５と、従動ローラー（テンションローラー）４６との、３部材間にエンドレスベルト状の導電部材としてのフィルム１を懸回張設して駆動ローラー４５によりフィルム１を回転駆動する構成のものである。３はフィルム１を挟んでステー下面に圧接させた加圧ローラーであり、フィルム１の回転移動に伴い従動回転する。

【００３８】（ｂ）のものは、電磁誘導加熱構造体Ｒのステー下面と駆動ローラー４５の２部材間にエンドレスベルト状の導電部材としてのフィルム１を懸回張設して駆動ローラー４５により回転駆動する構成のものである。

【００３９】（ｃ）のものは、導電部材としてのフィルム１として、エンドレスベルト状のものではなく、ロール巻きにした長尺の有端フィルムを用い、これを繰り出し軸４８側から電磁誘導加熱構造体Ｒのステー下面を経由させて巻き取り軸４９側へ所定の速度で走行させるように構成したものである。

【００４０】〈実施形態例５〉（図１０）

本実施形態は例えば前述実施形態１の電磁誘導加熱方式の加熱装置を画像加熱定着装置（加熱装置）１０として用いた画像形成装置の一例の概略構成図である。本実施形態の画像形成装置は、電子写真プロセス利用のレーザービームプリンターである。

【００４１】１１は像担持体（第１の像担持体）としての回転ドラム型の電子写真感光体（以下、感光ドラムと記す）である。該感光ドラム１１は矢印の反時計方向に所定の周速度（プロセススピード）をもって回転駆動され、その回転過程で一次帯電器１２によりマイナスの所定の暗電位V_Dに一様に帯電処理される。

【００４２】１３はレーザービームスキャナであり、不図示の画像読取装置・ワードプロセッサ・コンピュータ等のホスト装置から入力される目的画像情報の時系列電気デジタル画素信号に対応して変調されたレーザービームＬを出力し、前記のように一次帯電器１２でマイナスに一様帯電された感光ドラム１１面が該レーザービームで走査露光されることで露光部分の電位絶対値が小さくなって明電位V_Lとなり回転露光ドラム１１面に目的の画像情報に対応した静電潜像が形成されていく。

【００４３】次いでその潜像は現像器１４によりマイナ

スに帯電した粉体トナーで反転現像（レーザー露光部ＶＬにトナーが付着）されて顕像化される。

【００４４】現像器１４は回転駆動される現像スリーブ１４０２と現像ブレード１４０１とを有しており、該現像ブレード１４０１としては通常金属製若しくは樹脂製のものが用いられ、樹脂系のものは現像スリーブ１４０２に対して適正な当接圧をもって接している。そして現像スリーブ１４０２と現像ブレード１４０１とによって、トナー高さ、トリボを制御され、現像スリーブ上１４０２にマイナスの電荷をもった均一なトナー層が形成されて感光ドラム１１面と対向し、スリーブ１４０２にはその絶対値が感光ドラム１１の暗電位ＶＤよりも小さく、明電位ＶＬよりも大きな現像バイアス電圧ＶＤＣが印加されていることで、スリーブ１４０２上のトナーが感光ドラム１１の明電位ＶＬの部分にのみ転移して潜像が顕像化（反転現像）される。

【００４５】一方、給紙トレー２５上に積載セットされている被記録材（第２の像担持体、転写紙）Ｐが給紙ローラー２６により１枚宛繰り出し給送され、搬送ガイド２７、レジストローラー対２８、転写前ガイド２９を経由して、感光ドラム１１と転写装置１５との対向位置（転写部）へ、感光ドラム１１の回転と同期とりされた適切タイミングをもって給送され、転写バイアスが印加された転写装置１５によって該転写部を通過する被記録材Ｐ面に感光ドラム１１面側のトナー像が順次に転写されていく。

【００４６】該転写部を通った被記録材Ｐは感光ドラム１１面から分離され、搬送ガイド３４で定着装置１０へ導入されて転写トナー像の定着を受け、画像形成物（プリント）として排紙トレイ３６へ出力される。被記録材分離後の感光ドラム１１面はクリーニング装置３３で転写残りトナー等の感光ドラム面残留物の除去を受けて清浄面化されて繰り返して作像に供される。

【００４７】〈その他〉尚、以上の各形態例では加熱部材として、フィルムに発熱層を具備した例を示したが、フィルム自体を加熱体で構成したもの（金属スリーブ等）や、金属ローラに交番磁束を作用させるようにしたローラ方式のものでも良い。

【００４８】また、固定支持された導電性（望ましくは強磁性）の平板を用い、該平板に直接或はフィルムを介して加圧部材を圧接してニップを形成し、該平板に交番磁束を作用させて発熱させ、該ニップを通過させる被加熱材の加熱処理を行う構成であっても良い。

【００４９】

【発明の効果】以上説明したように、本出願に係る発明によれば、励磁コイルが発生させる端部磁界を補正し、加熱部の被加熱材幅方向に関する発熱量の分布を均一にすることが可能な加熱装置及び該加熱装置を備えた画像形成装置の提供を達成することができる。

【００５０】また、該画像形成装置において定着不良や光沢ムラやオフセットの無い高いパフォーマンスを達成することができる。

【図面の簡単な説明】

【図１】　実施形態１の加熱装置の概略構成を示す模型図

【図２】　単一巻励磁コイルにおける磁界発生分布及びニップの温度分布の説明図

【図３】　端部補正巻励磁コイルにおける磁界発生分布及びニップの温度分布の説明図

【図４】　励磁コイル端部の説明図

【図５】　励磁コイルの他の構成を示す該励磁コイルとコアの模式断面図

【図６】　実施形態２の磁界発生手段の端部構成を示す模式図

【図７】　実施形態２の磁界発生手段の端部構成を示す模式図

【図８】　励磁コイルの他の形態の概略構成図

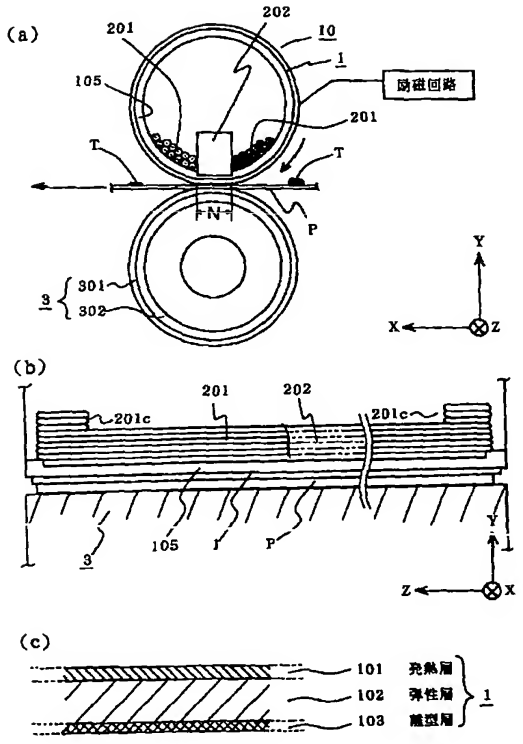
【図９】　加熱装置の他の形態の概略構成図

【図１０】　画像形成装置の概略構成図

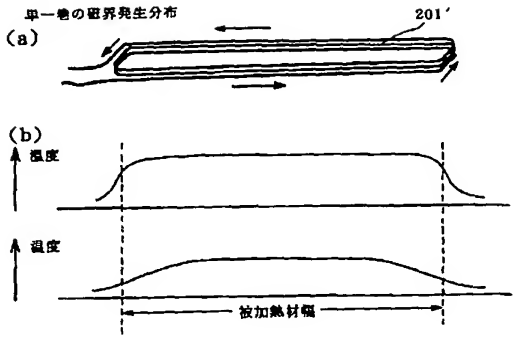
【符号の説明】

１　定着フィルム
１０１　発熱層
１０２　弾性層
１０３　離型層
１０５　フィルムガイド
２０１　励磁コイル
２０２　コア
２０３　補正用コア
３　加圧ローラ
３０１　芯金
３０２　シリコーンゴム
１０　定着装置
１１　感光ドラム
１２　一次帯電器
１３　スキャナー
１４　現像器
１４０１　現像ブレード
１４０２　現像スリーブ
１５　転写装置

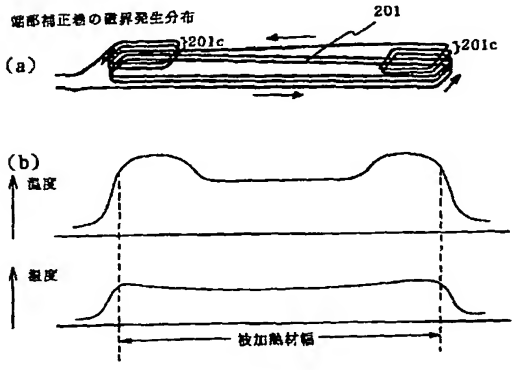
【図１】



【図２】



【図３】



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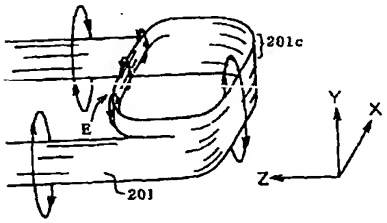
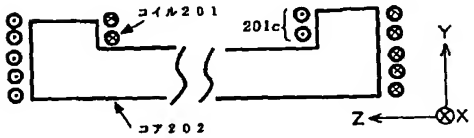
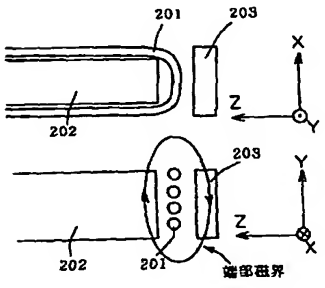


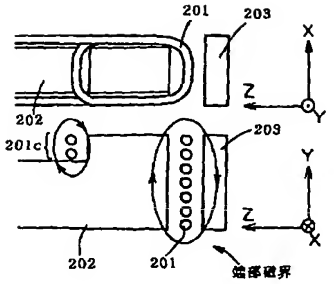
【図５】



【図６】



【図７】


201
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Z
Y
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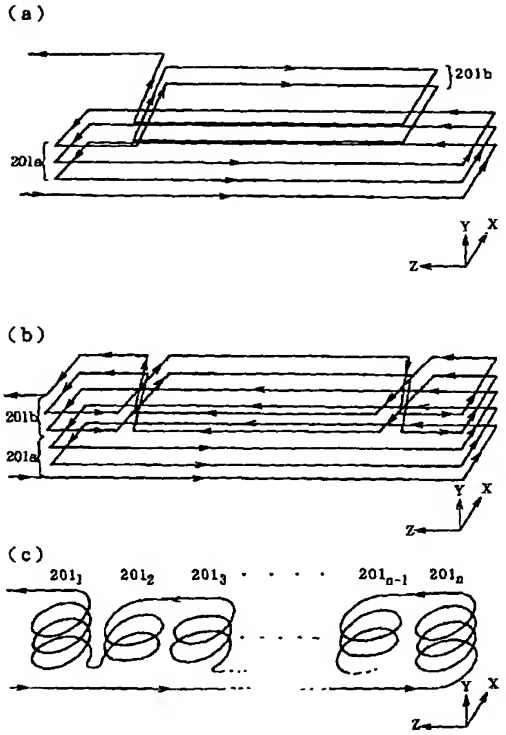
【図８】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Y X
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(b)
201b
201a
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Z
(c)
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Y X
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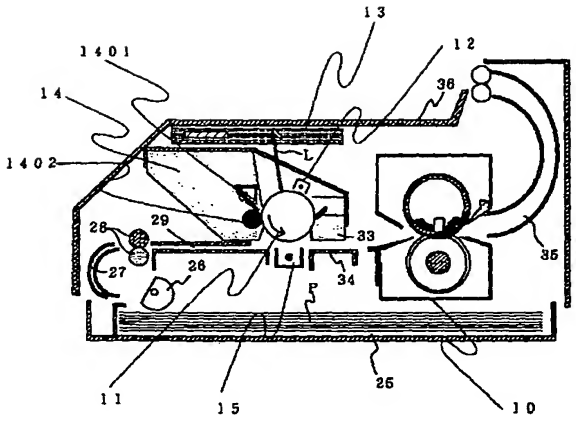
【図１０】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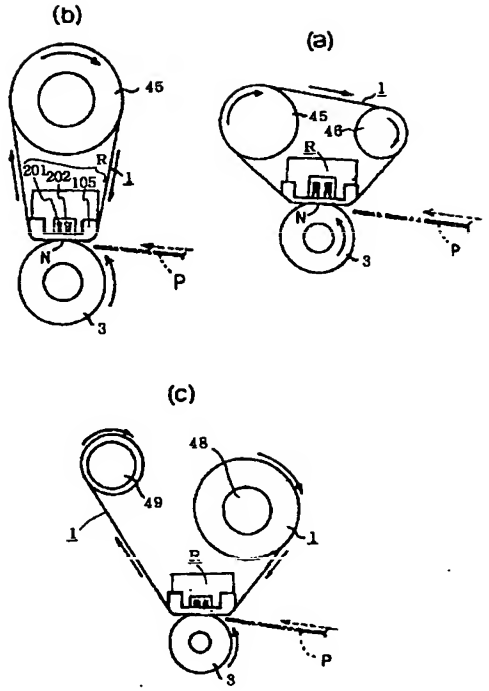
【図９】



フロントページの続き

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HEATER AND IMAGE FORMING DEVICE

Patent Number: JP10064670

Publication date: 1998-03-06

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Applicant(s): CANON INC

Requested Patent: ☐ JP10064670

Application Number: JP19960238602 19960821

Priority Number(s):

IPC Classification: H05B6/14

EC Classification:

Equivalents:

Abstract

PROBLEM TO BE SOLVED: To provide a heater capable of heating with uniform temperature distribution so as to prevent inferior fixing, uneven glossiness, and offset when the heater is applied to an image forming device by correcting an end part magnetic field generated by an exciting coil. SOLUTION: A fixing film represented by 1 is composed of a heating layer 101, an elastic layer 102, and a mold release layer 103. An exciting coil is represented by 201, and a ferrite core by 202 a pressing roller is represented by 3 that forms a nip N through pressure contact with a lower face of a film guide 105 via the fixing film 1. An alternating magnet flux generated by the exciting coil 201 is led to the ferrite core 202, an eddy current is generated in the heating layer 101 of the fixing film, and a recording material P that is a heated material to be carried to the nip N by the heat generated by the eddy current and a toner T on the recording material P is heated. The energizing coil 201 is improved in that the number of turns at an end part 201c is greater than that at the center in the widthwise direction of the heated material P.

PATENT ABSTRACTS OF JAPAN

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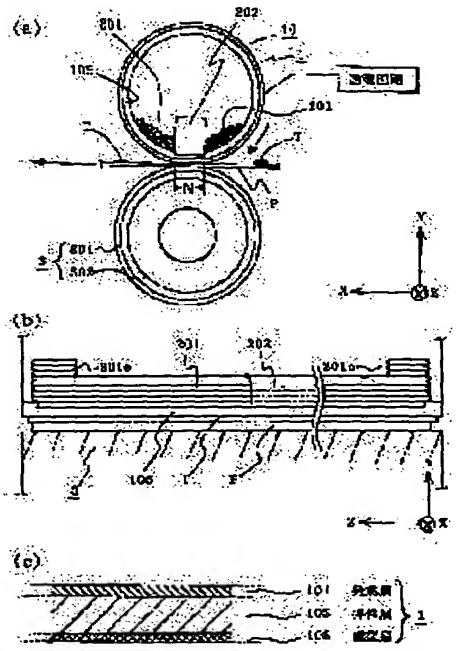
(71)Applicant : CANON INC
(72)Inventor : KANEDA KEISUKE
HAYASHIZAKI MINORU
NAKANE KIYOBUMI
NANATAKI HIDEO

54) HEATER AND IMAGE FORMING DEVICE

57)Abstract:
'ROBLEM TO BE SOLVED: To provide a heater capable of heating with niform temperature distribution so as to prevent inferior fixing, uneven lossiness, and offset when the heater is applied to an image forming evice by correcting an end part magnetic field generated by an exciting oil.
;OLUTION: A fixing film represented by 1 is composed of a heating layer 01, an elastic layer 102, and a mold release layer 103. An exciting coil is epresented by 201, and a ferrite core by 202 a pressing roller is epresented by 3 that forms a nip N through pressure contact with a ›wer face of a film guide 105 via the fixing film 1. An alternating magnet ux generated by the exciting coil 201 is led to the ferrite core 202, an ddy current is generated in the heating layer 101 of the fixing film, and a ecording material P that is a heated material to be carried to the nip N by he heat generated by the eddy current and a toner T on the recording ıaterial P is heated. The energizing coil 201 is improved in that the ıumber of turns at an end part 201c is greater than that at the center in he widthwise direction of the heated material P.



EGAL STATUS

Date of request for examination]

Date of sending the examiner's decision of rejection]

Kind of final disposal of application other than the ›xaminer's decision of rejection or application converted egistration]

Date of final disposal for application]

Patent number]

Date of registration]

Number of appeal against examiner's decision of ejection]

Date of requesting appeal against examiner's decision ›f rejection]

Date of extinction of right]

NOTICES *

This document has been translated by computer.So the translation may not reflect the original precisely.
**** shows the word which can not be translated.
In the drawings, any words are not translated.

LAIMS

:laim(s)]
:laim 1] The heating component which fixes or moves, and a magnetic field generating means to generate alternating eld and to make this heating component generate heat by operation of this magnetic field, When it is the heating ɔparatus which it has the pressurization member which is made to carry out a pressure welding to this heating ɔmponent, and forms a nip, and heated material is conveyed to this nip, it is passed, and heats this heating material ıd the heated material conveyance direction and the direction which intersects perpendicularly are made into the ɛated material cross direction, Heating apparatus characterized by having changed the density of the magnetic flux ɛnerated by the aforementioned magnetic field generating means in the heated material cross direction of a heating ɔmponent, and making uniform the temperature distribution of the heated material cross direction of a nip.
:laim 2] The heating component which fixes or moves, and a magnetic field generating means to generate alternating eld and to make this heating component generate heat by operation of this magnetic field, When it is the heating ɔparatus which it has the pressurization member which is made to carry out a pressure welding to this heating ɔmponent, and forms a nip, and heated material is conveyed to this nip, it is passed, and heats this heating material ıd the heated material conveyance direction and the direction which intersects perpendicularly are made into the ɛated material cross direction, The aforementioned magnetic field generating means is heating apparatus ıaracterized by making flux density in a heating component edge higher than the heating component center section of ıe heated material cross direction.
:laim 3] The aforementioned magnetic field generating means is the claim 1 or the heating apparatus of 2 ıaracterized by making [more] the number of turns of an edge in the heated material cross direction of the exiting ɔil which generates a magnetic field than a center section.
:laim 4] The aforementioned magnetic field generating means is heating apparatus given in any of the claim 1 ıaracterized by having arranged the core for amendment near the edge in the heated material cross direction of the citing coil which generates a magnetic field, and centralizing magnetic flux, or a claim 3 they are.
:laim 5] Heating apparatus given in any of the claim 1 characterized by heat-treating the **** agent picture made to ıpport on record material, or a claim 4 they are.
:laim 6] Image formation equipment characterized by having an image formation means to make a **** agent picture ıpport on record material, and heating apparatus given in any of the claim 1 as image heating apparatus which heat-eats this **** agent picture, or a claim 4 they are.

Translation done.]

ETAILED DESCRIPTION

)etailed Description of the Invention]
)001]
he technical field to which invention belongs] this invention uses electromagnetic induction and relates to image rmation equipment equipped with the heating apparatus and it which carry out making a heating unit generate an ldy current loss etc., and are heated. Especially this heating apparatus is suitable for the equipment which carries out eating fixing processing of the toner picture which is not established [which was formed in the field of record aterial by direct or the indirect method using the toner which consists of a resin of heating melting nature etc.] as a ermanent fixing picture in a record material side by proper image-formation process meanses, such as the fixing uipment in image formation equipments, such as an electrophotography copying machine and printer facsimile, i.e., ectrophotography, electrostatic recording, magnetic recording, etc.
)002]
)escription of the Prior Art] As heating apparatus represented by heating fixing equipment, a heat mechanical control / roller and the so-called contact heating methods, such as a film heating method, are widely used from the former.
)003] Also in it, the toner image is heated through rodding of the fixing roller which has high heat capacity, the rubber astic layer for wrapping in a toner image and fusing uniformly, etc. with the fixing equipment of the image formation uipment which performs full color image formation of which the capacity to which heating melting of a maximum of ur-layer toner layer is carried out enough is required.
)004] In such equipment, since interstitial segment material, such as rodding and rubber elastic layer, was prepared, hen good fixing nature was secured, it was in the inclination which a heat source and heated material leave, and ficient-izing was difficult.
)005] On the other hand, in JP,5-9027,B, the heating apparatus of the electromagnetic heating method which a fixing ller is made to generate an eddy current by magnetic flux, and is made to generate heat by the Joule's heat is dicated, near of the exoergic position could be carried out to the toner image by using generating of an eddy current, id the fixing process more efficient than the heat roller using the halogen lamp is attained.
)006]
roblem(s) to be Solved by the Invention] However, in the heating apparatus of the above-mentioned electromagnetic eating method, thermolysis of a heating unit edge, when the generating states of magnetic flux differed in an edge and e center section, the bird clapper had heating to heated material unevenly. For this reason, problems, such as poor xing, gloss nonuniformity, and offset, had occurred with image formation equipment equipped with this heating paratus.
)007] Then, the purpose of this invention should maintain uniform temperature distribution in the heated material oss direction of a heating unit in heating apparatus. Moreover, it is in attaining the high performance which has either poor fixing, uneven brightness nor offset also in image formation equipment equipped with this heating paratus.
)008]
Means for Solving the Problem] this invention is the heating apparatus and image formation equipment which are haracterized by the following composition.
)009] (1) The heating component which fixes or moves, and a magnetic field generating means to generate alternating eld and to make this heating component generate heat by operation of this magnetic field, When it is the heating paratus which it has the pressurization member which is made to carry out a pressure welding to this heating mponent, and forms a nip, and heated material is conveyed to this nip, it is passed, and heats this heating material id the heated material conveyance direction and the direction which intersects perpendicularly are made into the eated material cross direction, Heating apparatus characterized by having changed the density of the magnetic flux

nerated by the aforementioned magnetic field generating means in the heated material cross direction of a heating mponent, and making uniform the temperature distribution of the heated material cross direction of a nip.
010] (2) The heating component which fixes or moves, and a magnetic field generating means to generate alternating ld and to make this heating component generate heat by operation of this magnetic field, When it is the heating paratus which it has the pressurization member which is made to carry out a pressure welding to this heating mponent, and forms a nip, and heated material is conveyed to this nip, it is passed, and heats this heating material d the heated material conveyance direction and the direction which intersects perpendicularly are made into the ated material cross direction, The aforementioned magnetic field generating means is heating apparatus aracterized by making flux density in a heating component edge higher than the heating component center section of e heated material cross direction.
011] (3) The aforementioned magnetic field generating means is heating apparatus of (1) or (2) characterized by aking [more] the number of turns of an edge in the heated material cross direction of the exiting coil which nerates a magnetic field than a center section.
012] (4) The aforementioned magnetic field generating means is heating apparatus given in any of (1) or (3) which e characterized by having arranged the core for amendment near the edge in the heated material cross direction of the iting coil which generates a magnetic field, and centralizing magnetic flux they are.
013] (5) Heating apparatus given in any of (1) or (4) which are characterized by heat-treating the **** agent picture ade to support on record material they are.
014] (6) Image formation equipment characterized by having an image formation means to make a **** agent cture support on record material, and heating apparatus given in (1) as image heating apparatus or any of (4) they are. which heat-treats this **** agent picture]
015] That is, in the both ends of the above-mentioned coil, generating more magnetic flux compared with the crease of number of turns, and a center section, by leading to a heating unit, without arranging the core for nendment near the both ends of the above-mentioned coil, and dispersing magnetic flux at this edge in addition to a ating unit, etc., the distribution of magnetic flux which makes it generate with a magnetic field generating means can e set up appropriately, and the temperature distribution of the cross direction of a heating component can be made iform.
016]
mbodiments of the Invention]
Example 1 of an operation form> The longitudinal-section model view and drawing 1 (c) of the cross-section model iew (1) whole heating-apparatus showing [1] the outline composition of the fixing equipment of this invention (a) d drawing 1 (b) are the ** type cross sections of a fixing film. It is the insulating film guide to which 1 does not bar a xing film and 105 does not bar passage of magnetic flux in this drawing, and the fixing film 1 rotates in the direction f an arrow, while conveyance stability is planned by the film guide 105. The exiting coil for 201 generating alternate agnetic flux and 202 are the ferrite cores for raising efficiently the alternate magnetic flux generated by the exiting oil 201 around a nip, and are supported by the film guide 105.
017] The excitation circuit is connected to the exiting coil 201, and this excitation circuit can supply now 50kHz olice box current to an exiting coil 201. 3 makes the silicone rubber layer 302 cover with a pressurization roller 2mm n rodding 301, gives elasticity, and through the fixing film 1, the pressure welding of it is carried out to the ndersurface of the film guide 105, and it forms Nip N in it. Moreover, as for the pressurization roller 3, the role of the rive roller which carries out a rotation drive also serves as the fixing film 1 in the conveyance direction (X shaft rientations in drawing) of the record material P as heated material.
018] It **, and this alternate magnetic flux is led to a ferrite core 202, and makes the exoergic layer 101 of the fixing ilm 1 for the above-mentioned heating apparatus to supply police box current to a coil 201 from an excitation circuit, generate alternate magnetic flux, and generate an eddy current. This eddy current generates the Joule's heat with the pecific resistance of the exoergic layer 101, and heat-treats the toner T on the record material P conveyed by Nip N rough the elastic layer 102 and the mold release layer 103, and the record material P.
0019] (2) If the fixing film 1 fixing film 1 is explained, the fixing film 1 covers the front face of the exoergic layer 101 with a thickness of 50 micrometers it is thin from the nickel as a heating element with the elastic layer 102 which onsists of silicone rubber, and has covered it with the mold release layer 103 of a fluororesin further.
0020] As an exoergic layer 101, it is 10-5 to 10-10 besides nickel. The metal which is the electric good conductor of mega-m, metallic compounds, and an organic conductor may be used, and pure metals or those compounds, such as nore desirable iron with high (ferromagnetism is shown) permeability and cobalt, can be used.
0021] If thickness of this exoergic layer 101 is made thin too much, it becomes impossible to secure sufficient nagnetic path, magnetic flux may leak to the exterior, and own exoergic energy of a heating element may become

ıall. Moreover, when it thickens, there is an inclination for heat capacity to become large and for the time which a nperature up takes to become long. Therefore, with the value of the specific heat of the material used for the heating :ment, density, permeability, and resistivity, the proper value had the thickness of the exoergic layer 101, and with :s operation gestalt, it is the range of 10-100-micrometer thickness, and was able to obtain the programming rate 3 grees C / more than sec.

022] In the elastic layer 102, if a degree of hardness is too high, the irregularity of record material or a toner layer ll not be able to be followed, and picture gloss nonuniformity will occur. Then, as a degree of hardness of this elastic yer 102, below 45 degrees (JIS-A) are more preferably good below 60 degrees (JIS-A). Moreover, about the thermal nductivity lambda of the elastic layer 102, 6x10-4 to 2x10-3 [cal/cm-sec-deg.] is good. Thermal conductivity lambda thermal resistance is large when smaller than 6x10-4 [cal/cm-sec-deg.], and the temperature rise in the surface of the ting film 1 becomes late.

023] As a mold release layer 103, a good material of mold-releases characteristic, such as silicone resin, silicone bber, and a fluororubber, and thermal resistance can be chosen in addition to fluororesins, such as PFA, PTFE, and EP. If the thickness of the mold release layer 103 has desirable 20-100 micrometers and the thickness of this mold lease layer 103 is smaller than 20 micrometers, the problem that the ** nonuniformity of a paint film arises, the bad rtion of a mold-release characteristic is made, or endurance runs short at the time of manufacture will occur. oreover, if a mold release layer exceeds 100 micrometers, the problem that heat conduction gets worse will occur, pecially when it is the mold release layer of a resin system, a degree of hardness will become high too much, and the fect of the elastic layer 102 will fade.

024] (3) Exiting coil 201 (drawing 2)

lthough alternate magnetic flux sufficient as an exiting coil 201 for heating is generated, for that, it is low in a sistance component, and it is necessary to take a high inductance component. With this operation form, it has wound 2 times so that a core 202 may be around gone using the thing of phi 1 for RFs which bundled the thin line as a core ire of an exiting coil 201, as shown in drawing 2 .

025] To having been single volume coil 202' as conventionally shown in drawing 2 (a), in this example of an peration form, as shown in drawing 3 (a), one electric wire is coiled continuously, and the number of turns of both ıds are increased rather than the number of turns (12 times) of a center section. namely, loss of the weak edge of agnetic field restraint -- an amendment -- like -- the increase of the number of turns of an edge -- flux density is rengthened partially

026] The heating apparatus which made other composition the same was equipped with such conventional exiting-oil 201' and the exiting coil 201 of this example, the distribution of the longitudinal direction (heated material cross irection) of the flux density of a longitudinal direction and nip N temperature was compared, and it was shown in rawing 2 (b) and drawing 3 (b).

027] In conventional exiting-coil 201', as shown in drawing 2 (b), flux density is abbreviation regularity over a ngitudinal direction, and the temperature of Nip N is low at both ends according to that the magnetic-flux flux of ght force in the crosswise edge of a heating component is weak, there being many heat releases, etc.

028] On the other hand, in the exiting coil 201 of this example, by having made flux density of a longitudinal irection edge high compared with the center section, as shown in drawing 3 (b), it crossed throughout the longitudinal irection of Nip N, and uniform temperature distribution have been obtained. In the field E shown in drawing 4 at this me, although few reverse magnetic fields arise, it is the grade which can be disregarded almost uninfluential to the mperature of Nip N.

029] Furthermore, since a magnetic path is secured like drawing 5 , it can be made more effective by extending a rrite core to the portion of amendment coil 201c.

030] <The example 2 of an operation gestalt> (drawing 6 and drawing 7)

Moreover, a core 202 and the ferrite core 203 of this quality of the material are arranged at the edge of an exiting coil 01 like drawing 6 as other examples of an operation gestalt, and it becomes possible to prevent emission of a agnetic field by securing a magnetic path to the magnetic flux emitted from an edge, and to carry out flux density of n edge to a part for a center section more than equivalent.

0031] Moreover, the distribution of magnetic flux can be set up still more effectively by forming the core 203 for mendment with amendment coil 201c, as shown in drawing 7 .

0032] <The example 3 of an operation gestalt> (drawing 8)

a) -(b) - (c) of drawing 8 shows other examples of a gestalt of an exiting coil 201, respectively.

0033] The thing of (a) has amendment section 201b of a retrose to principal part 201a for making a heating omponent heat, and this principal part 201a, attenuates the magnetic flux of a center section by amendment section 201b among the magnetic flux by principal part 201a, and is raising the flux density of an edge relatively.

)34] To principal part 201a, at the heated material cross direction edge, it was made as the forward direction, it made ıendment section 201b the opposite direction in the center section, and the thing of (b) has amended the distribution magnetic flux more effectively.
035] The thing of (c) is 2011-201n of n coils to the heated material cross direction. It is connecting and installing in a rial or parallel (illustration is in-series) side by side, and is coil 2012 -201n-1 of a center section. It compares and ey are the coil 2011 of an edge, and 201n. Number of turns are increased.
036] <The example 4 of an operation form> (drawing 9)
) -(b) - (c) of drawing 9 shows other examples of a composition form of the heating apparatus of an electromagnetic-duction heating method, respectively.
037] The thing of (a) is a thing of composition of carrying out the **** set-up of the film 1 as endless-belt-like nductive member, and carrying out the rotation drive of the film 1 with the drive roller 45 in between, 3 member, of e undersurface (undersurface of stay 105) of the electromagnetic-induction heating structure R which has stay (film ıide) 105, an exiting coil 201, and core 202 grade, the drive roller 45, and the follower roller (tension roller) 46. 3 is e pressurization roller made [the stay undersurface] to carry out a pressure welding on both sides of a film 1, and rries out follower rotation with a rotation of a film 1.
038] The thing of (b) is a thing of the stay inferior surface of tongue of the electromagnetic-induction heating ructure R, and the composition of carrying out the **** set-up of the film 1 as endless-belt-like conductive member, ıd carrying out a rotation drive with the drive roller 45 in between, 2 members, of the drive roller 45.
039] As a film 1 as conductive member, using the owner edge film of the long picture made into the endless-belt-like ll volume instead of a thing, the thing of (c) lets this out, makes it go via the stay inferior surface of tongue of the ectromagnetic-induction heating structure R from a shaft 48 side, is rolled round, and it is constituted so that it may : made to run at the rate of predetermined to a shaft 49 side.
)040] <The example 5 of an operation gestalt> (drawing 10)
his operation gestalt is the outline block diagram of an example of image formation equipment which used the :ating apparatus of the electromagnetic-induction heating method of the above-mentioned operation gestalt 1 as cture heating fixing equipment (heating apparatus) 10. The image formation equipment of this operation gestalt is the ser beam printer of electrophotography process use.
)041] 11 is an electrophotography photo conductor (it is hereafter described as a photoconductor drum) rotating-drum pe [as an image support (1st image support)]. A rotation drive is carried out with a predetermined peripheral elocity (process speed) at the counterclockwise rotation of an arrow, and this photoconductor drum 11 is the :edetermined dark potential VD of minus [in the rotation process] with the primary electrification vessel 12. lectrification processing is carried out uniformly.
)042] The laser beam L modulated corresponding to the time series electrical-and-electric-equipment digital pixel gnal of the purpose image information which 13 is a laser-beam scanner and is inputted from host equipments, such ; non-illustrated a picture reader, a word processor computer, etc., is outputted. The potential absolute value of an kposure portion becomes small by scanning exposure of the 11th page of the photoconductor drum by which uniform lectrification was carried out as mentioned above with the primary electrification vessel 12 at minus being carried out y this laser beam, and it is the Ming potential VL. It becomes and the electrostatic latent image corresponding to the ırget image information is formed in the 11th page of a rotation exposure drum.
)043] Subsequently, with the fine-particles toner charged in minus with the development counter 14, reversal evelopment (a toner adheres to the laser exposure section VL) is carried out, and it develops the latent image.
)044] The development counter 14 has the development sleeve 1402 and the development blade 1401 by which a ɔtation drive is carried out, the thing made of metal or a resin was usually used as this development blade 1401, and ıe thing of a resin system has touched with proper contact pressure to the development sleeve 1402. With the evelopment sleeve 1402 and the development blade 1401, and toner height, The uniform toner layer which TORIBO /as controlled and had the charge of minus in development sleeve top 1402 is formed, and it counters with the 11th age of a photoconductor drum. In a sleeve 1402, the absolute value is the dark potential VD of a photoconductor drum 1. It is small and is the Ming potential VL. By the big development bias voltage VDC being impressed The toner on a leeve 1402 is the Ming potential VL of a photoconductor drum 11. It transfers only to a portion and develops a latent nage (reversal development).
0045] It goes via 28 and the guide 29 before an imprint. on the other hand, the recorded material (the 2nd image upport, transfer paper) P by which the loading set is carried out on the paper tray 25 carries out one-sheet ********** eed with the feed roller 26 -- having -- the conveyance guide 27 and a resist roller pair -- The opposite position imprint section) of a photoconductor drum 11 and imprint equipment 15 is fed with the suitable timing by which ynchronising was carried out to rotation of a photoconductor drum 11. The toner image by the side of the 11th page of

hotoconductor drum is imprinted one by one by the Pth page of the recorded material which passes this imprint tion with the imprint equipment 15 by which imprint bias was impressed.

)46] It dissociates from the 11th page of a photoconductor drum, and the recorded material P which passed along s imprint section is introduced in the conveyance guide 34 to fixing equipment 10, and receives fixing of an imprint er image, and a delivery tray 36 HE output is carried out as an image formation object (print). the 11th page of the otoconductor drum after recorded material separation is pure in response to removal of the photoconductor drum e residues, such as the imprint remaining toner, with cleaning equipment 33 -- a field -- are-izing and imaging is sented repeatedly

)47] <Others> Although each example [still more more than] of a gestalt showed the example possessing the ergic layer to the film as a heating component, what constituted the film itself from a heating object, and the thing the mechanical control by roller it was made to make alternate magnetic flux act on metal rollers (metal sleeve etc.) y be used.

)48] Moreover, you may be the composition of heat-treating the heated material which the pressure welding of the ssurization member is carried out to this plate through direct or a film, and a nip is formed using the conductive sirably ferromagnetism) plate by which fixed support was carried out, and makes alternate magnetic flux acting on s plate, makes it generating heat, and passes this nip.

)49]

ffect of the Invention] As explained above, according to invention concerning this application, the edge magnetic ld which an exiting coil generates can be amended, and offer of image formation equipment equipped with the ating apparatus which can make uniform the distribution of the calorific value about the heated material cross ection of a heating unit, and this heating apparatus can be attained.

)50] Moreover, the high performance which has neither poor fixing, gloss nonuniformity nor offset in this image rmation equipment can be attained.

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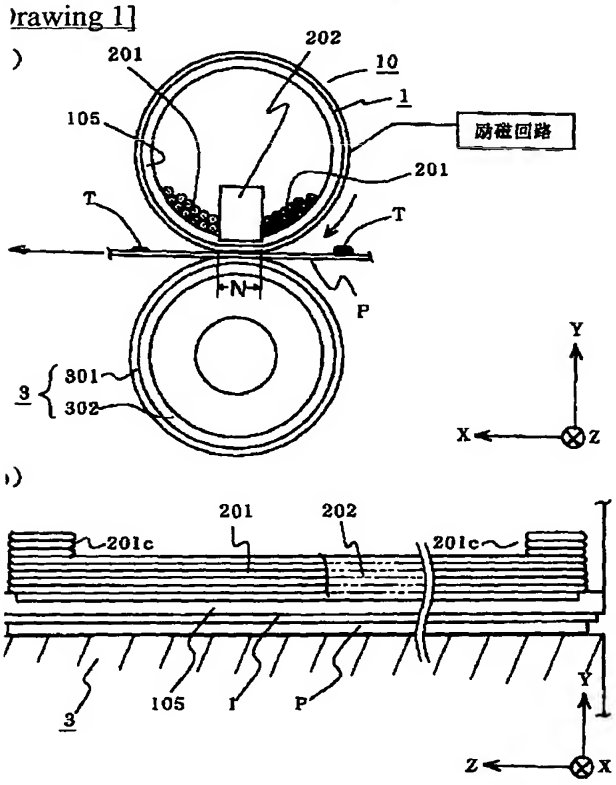
ranslation done.]

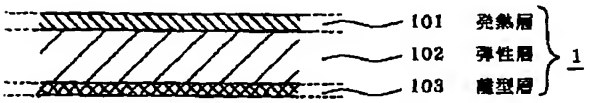
NOTICES *

This document has been translated by computer. So the translation may not reflect the original precisely.
**** shows the word which can not be translated.
In the drawings, any words are not translated.

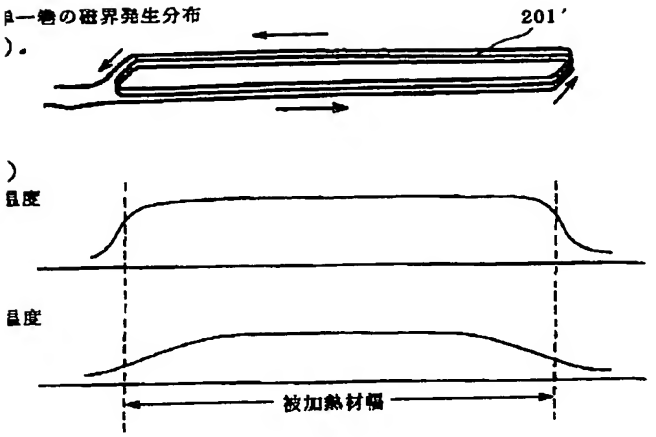
DRAWINGS

Drawing 1]

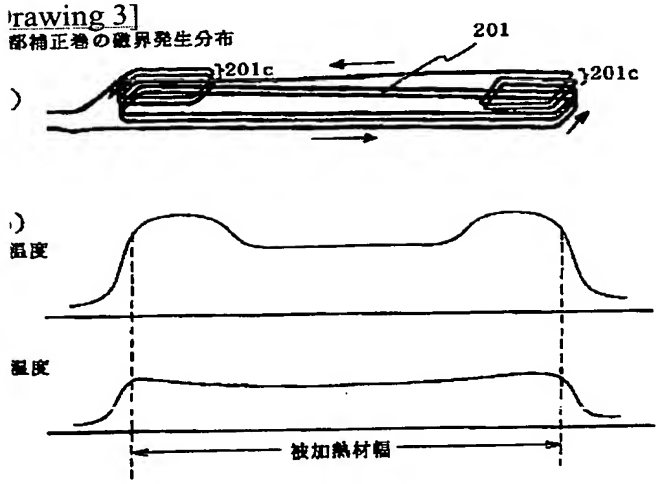




Drawing 2]



rawing 3]



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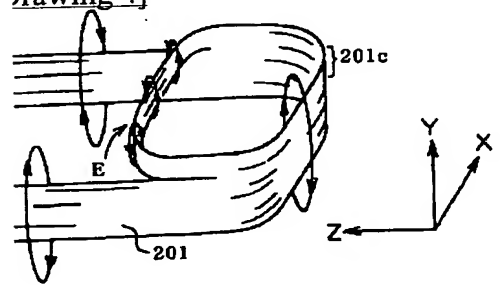

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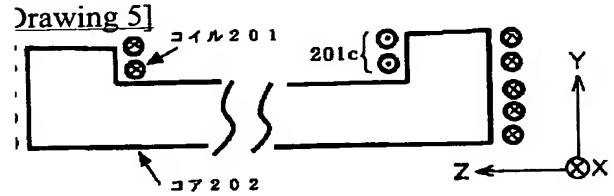

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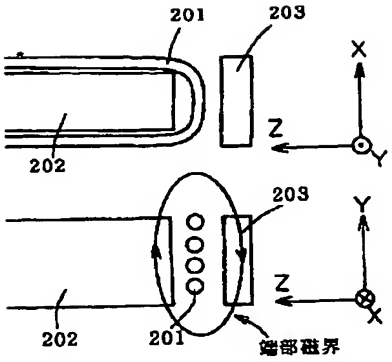
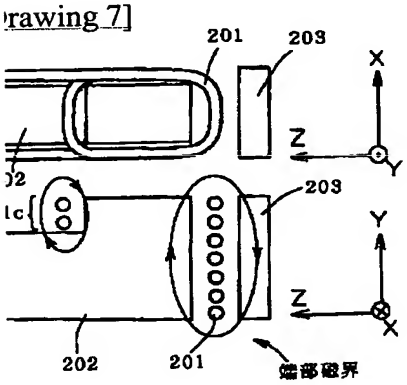


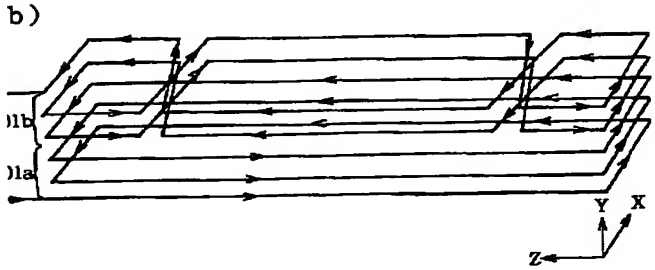
rawing 7]



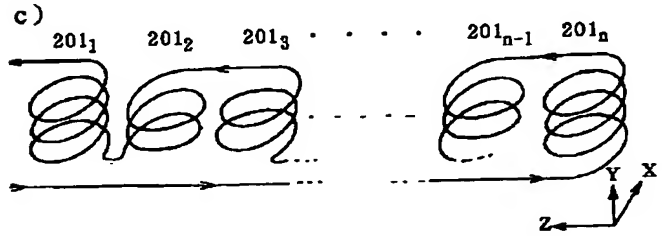
)rawing 8]

a)

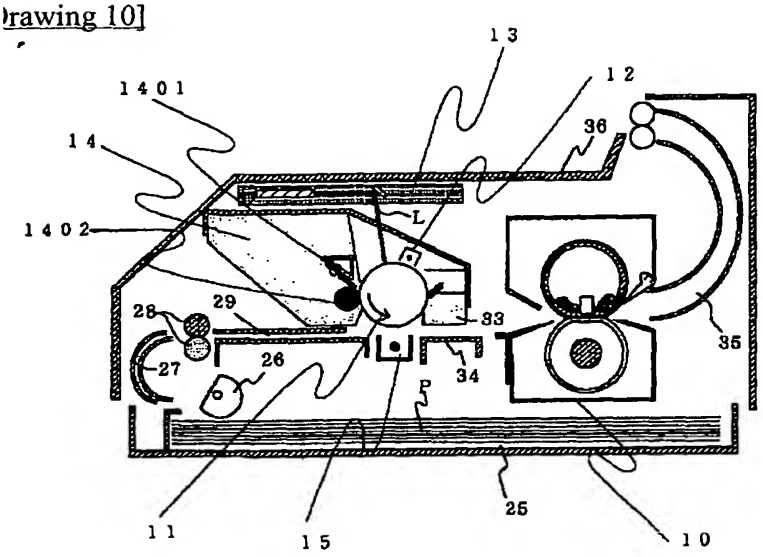
b)



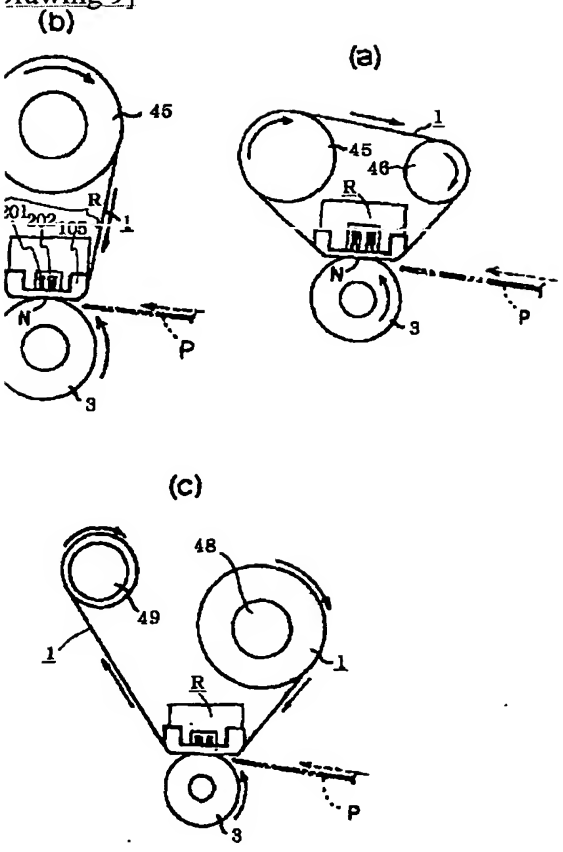
c)



Drawing 10]



Drawing 9]



Translation done.]